NUCLEAR WASTE TECHNICAL REVIEW BOARD
FULL BOARD MEETING

SUBJECT: YUCCA MOUNTAIN PROJECT OFFICE UPDATE

PRESENTER: CARL P. GERTZ

PRESENTER'S TITLE AND ORGANIZATION:
PROJECT MANAGER
DEPARTMENT OF ENERGY
LAS VEGAS, NEVADA

PRESENTER'S TELEPHONE NUMBER: (702) 794-7920

DENVER, COLORADO
JULY 13-14, 1993
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Yucca Mountain Studies:
A Program of Underground and Surface Based Testing to Solve a National Environmental Problem
SCIENTIFIC STUDIES FROM THE SURFACE AND UNDERGROUND ARE NEEDED TO DETERMINE SITE SUITABILITY

Major Elements of the Site Characterization Program

• Surface Based
  - Borehole coverage:
    -- Systematic drilling program – examine site and surrounding area (phenomena, characteristics, trends and variability representativeness)
    -- Feature sampling program – investigate special features
  - Other activities:
    -- Mapping, geophysical surveys, trenching, monitoring, meteorology, laboratory testing, etc.

• Underground
  - Systematic mapping and sampling
  - ESF tests to characterize processes and conditions
  - Exploratory drifting
SCIENTIFIC STUDIES WILL DETERMINE IF YUCCA MOUNTAIN CAN BE RECOMMENDED AS A REPOSITORY

- NWPA 1982
- Today
- TBD
- 3 - 4 yrs
- NRC Review and Approval/Disapproval
- First possible waste receipt at repository 2010

SITE CHARACTERIZATION
LICENSING
CONSTRUCTION & OPERATION
WORK UNDERWAY
AT SEVERAL LOCATIONS

Summary

- ESF TBM starter tunnel 138 feet (42.1 meters) as of 7/2/93
- Initiated ESF testing with geologic mapping of the box cut and starter tunnel
- USW UZ-14 drilling began 4/15/93; 941 ft depth as of 7/2/93
- Drilling at borehole UZ-16 completed 3/11/93 at 1686 ft; water table was reached at a depth of 1604 ft, downhole testing currently underway
- 23 neutron access boreholes of the 24 borehole program completed for natural infiltration studies; final program borehole approval in process
- 6 trenches excavated and 4 pavements cleared for Quaternary fault studies; detailed trench logging and pavement studies continuing
- Fran Ridge pavement studies continue
# BOREHOLE PROGRAM

<table>
<thead>
<tr>
<th>Borehole Identifier</th>
<th>Depth (Ft.)</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neutron Borehole:</strong></td>
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</tr>
<tr>
<td>USW UZN-62</td>
<td>60.00</td>
<td>10 Mar 93</td>
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<tr>
<td><strong>North Ramp Geologic Boreholes:</strong></td>
<td></td>
<td></td>
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<tr>
<td>UE-25 NRG-2</td>
<td>294.06</td>
<td>27 Jan 93</td>
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<tr>
<td>UE-25 NRG-2A</td>
<td>265.64</td>
<td>21 May 93</td>
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<tr>
<td>UE-25 NRG-3</td>
<td>333.00</td>
<td>30 Mar 93</td>
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<td>UE-25 NRG-4</td>
<td>571.39*</td>
<td>08 Jul 93</td>
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<tr>
<td>UE-25 NRG-5</td>
<td>1350.00</td>
<td>09 Jun 93</td>
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<tr>
<td>UE-25 NRG-6</td>
<td>1100.10</td>
<td>03 Mar 93</td>
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* In progress
## BOREHOLE PROGRAM (CONTINUED)

<table>
<thead>
<tr>
<th>Borehole Identifier</th>
<th>Depth (Ft.)</th>
<th>Completion Date</th>
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</thead>
<tbody>
<tr>
<td><strong>Unsaturated Zone Boreholes:</strong></td>
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</tr>
<tr>
<td>USW UZ-14</td>
<td>954.04*</td>
<td>08 Jul 93</td>
</tr>
<tr>
<td>USW UZ-16</td>
<td>1686.16</td>
<td>10 Mar 93</td>
</tr>
<tr>
<td><strong>Miscellaneous:</strong></td>
<td></td>
<td></td>
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<tr>
<td>USW H-5</td>
<td>Replaced USGS packers</td>
<td>25 Mar 93</td>
</tr>
<tr>
<td>USW WT-7</td>
<td>Removed a blockage from the hole (workover)</td>
<td>09 Apr 93</td>
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</tbody>
</table>

* In progress
UNSATURATED ZONE (UZ) PROGRAM
DRILLING COMPARISON

• Present status for UZ-14
  - 950 ft. in 58 shifts = 16.38 ft/shift

• UZ-16 experience
  - 950 ft. in 106 shifts = 8.94 ft/shift
    Avg. to total depth (1686') = 9.26 ft/shift
SURFACE-BASED TESTING SUPPORTS RESOLUTION OF ISSUES INCLUDING REGIONAL HYDROLOGY AND FLOW RATES, SEISMIC HAZARD ANALYSIS, AND VOLCANISM

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<tr>
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<tbody>
<tr>
<td>Boreholes</td>
<td>199</td>
<td>31</td>
<td>78(^1)</td>
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<td>58(^2)</td>
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<tr>
<td>Trenches</td>
<td>95</td>
<td>22</td>
<td>27</td>
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<tr>
<td>Soil pits</td>
<td>0</td>
<td>106</td>
<td>40-50(^3)</td>
</tr>
</tbody>
</table>

1 50 ft deep and greater
2 50 ft deep or less
3 as req'd based on 20 facilities
As of July 9, 1993

<table>
<thead>
<tr>
<th>Drive</th>
<th>Length</th>
<th>Feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pilot Drive</td>
<td>52.4 m</td>
<td>172</td>
</tr>
<tr>
<td>North Slash</td>
<td>52.1 m</td>
<td>171</td>
</tr>
<tr>
<td>South Slash</td>
<td>52.1 m</td>
<td>171</td>
</tr>
</tbody>
</table>

Legend:
- PILOT DRIVE
- NORTH SLASH
- SOUTH SLASH
- BENCH DRIVE
ESF NORTH PORTAL DESIGN PACKAGE 1A

'93
200 ft
in the mountain
## NEAR-TERM CONSTRUCTION SUMMARY SCHEDULE

**As of 7-9-93**

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<tbody>
<tr>
<td><strong>Milestones</strong></td>
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<tr>
<td>Issue TBM RFP</td>
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<tr>
<td>Start site prep</td>
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<tr>
<td>Receive TBM proposals</td>
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<tr>
<td>Award TBM contract</td>
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<tr>
<td><strong>Prepare topsoil pad, road &amp; drainage</strong></td>
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<tr>
<td><strong>Construct north portal pad &amp; slot</strong></td>
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<tr>
<td><strong>Construct rock storage pad</strong></td>
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<tr>
<td><strong>Construct Upper Bench 200 ft starter tunnel</strong></td>
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<tr>
<td><strong>Construct Lower Bench 200 ft starter tunnel</strong></td>
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<tr>
<td>Continue Drill and Blast (optional)</td>
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</table>

As per the schedule:
- **Issue TBM RFP** by 4/94
- **Start site prep** by Jan 1993
- **Receive TBM proposals** by Feb 1993
- **Award TBM contract** by Mar 1993
- **Delivery of TBM** expected by Nov 1993

(For tasks marked with "complete," the completion dates are not specified in the diagram.)
CONSTRUCTION TUNNELING SERVICES, INC. (CTS) PROGRESS ON TBM THROUGH JULY 8, 1993

- $12 million contract
  - 720 tons
  - 3,800 horse power
  - 220 feet long (including machine and trailing gear)
  - 25 feet in diameter (7.6 meters)
- Cutterhead preliminary design complete
- Main bearing and seal design 95%, ready for detailing
- Main cylinders ready to release for quote
- Long lead items on order:
  - 2 main bearings
  - 12 main drive motors
  - 12 air clutches
  - 1 inching gear unit
  - 2 main thrust pumps
- We have CTS schedule; we are monitoring their performance to that schedule
- FOB delivery (70 truckloads) to ESF pad prior to April 5, 1994
'94 MAJOR TBM OPERATIONS
INITIAL 5-MILE RAMP/DRIFT LOOP WILL PROVIDE EARLY SITE SUITABILITY INFORMATION

Complete North Ramp
Start Main Drift Winter 1994

Begin TBM Operations at North Ramp Summer 1994

To Imbricate Fault

Construct Main Test Area 1996 to 1997
Start Thermal Testing Fall 1996

Construct Cross Drifts 1997 to 1998

Breakout South Ramp Fall 1995

Complete Main Drift Summer 1995

Construct South Ramp
NORTH RAMP DESIGN WILL INCLUDE AREAS OF GEOLOGIC INTEREST TO BE STUDIED

Conceptual Illustration
Not To Scale

Thermal/Mechanical Units

- **Tcw**: Tiva Canyon Member
- **PTn**: Yucca Mountain Member
  - Pah Canyon Member
  - and Bedded Tuff
- **TSw1**: Topopah Spring Member
- **TSw2**: Topopah Spring Member
- **TSw3**: Tuffaceous Beds of Calico Hills
- **CHn**: *Not differentiated

*NRAMPBW XSECT/7-10-92*
CONSTRUCTION MONITORING IN CONJUNCTION WITH GEOLOGIC SITE CHARACTERIZATION MAPPING IS PROVIDING DATA TO REFINE FUTURE DESIGN PACKAGES AND TO IMPROVE OPERATIONAL HEALTH & SAFETY

- Geologic mapping
  - Map highwall
  - Map tunnel

- Monitor highwall
  - Survey stations on to detect rock wall deformation
  - Load cells on to detect any major ground/rock mass movement

- Geomechanical monitoring of tunnel
  - Load cells
  - Closure pins on back and floor
  - Closure pins on lattice girders

- Blast monitoring
  - Each of the production blasts is being monitored

- Rock support monitoring
  - Pull test to determine their anchorage capacity
  - Grout use has been tested for strength
ESF - SUBSURFACE DESIGN
PROPOSED CHANGE IN STRATEGY
PACKAGE 2

Split Package 2 into three parts:

- Package 2A - Continue drill and blast from starter tunnel to Bow Ridge fault. Surface and subsurface conveyor specification. Elect equipment specification for TBM operation. Transportation study 7/19/93

- Package 2B - Excavation, ventilation and muck storage studies. Concrete and structural steel for Surface and subsurface conveyor. Specification for ventilation, rail haulage system and mapping platform procurement 9/20/93

- Package 2C - Complete remainder of north ramp design to Topopah Spring Level, including utilities, systems and equipment 1/10/94
## COMPARISON OF FY 1993 ENACTED AND FY 1994 PLANNED BUDGET SPLITS

<table>
<thead>
<tr>
<th>WBS</th>
<th>FY93 M$</th>
<th>FY94 M$</th>
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<td>1.2.1</td>
<td>5.5</td>
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<td>48.3</td>
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<tr>
<td>Management Reserve</td>
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<tr>
<td><strong>TOTAL</strong></td>
<td><strong>244.7</strong></td>
<td><strong>261.9</strong></td>
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IMPACTS OF $261.9M IN FY 1994

- Defer procurement of additional LM-300 and 2 additional lease type drill rigs
- Delay purchase of small diameter TBM & additional underground excavation equipment
- Defer some seismic hazards studies
- Defer 138kv power supply system procurement
- Defer additional scientific studies, (saturated zone, unsaturated zone and geologic studies) associated with the additional boreholes
- Minimize ACD for subsurface, surface and offsite facility
- Reduced drill rig activity-3 shifts to two shifts
- Minimize repository design for ESF interface in main test area
- Defer completion of Total System Performance Assessment model
Life of desert tortoise worth $100,000

"The death of one of the reptiles at a construction site results in a fine and a donation to the county."

Representatives with Silver State Leasing Inc., charged in federal court "the taking of a threatened desert tortoise," entered a plea agreement that resulted Friday in a $25,000 court fine and a $75,000 donation to the county.

The tortoise died during grading work at the Pebble Creek subdivision. Silver State Leasing, according to the charges, began work prior to submitting to a permitting process through the U.S. Fish and Wildlife Service, which would have conducted surveys to determine if tortoises were in the area.

Friday's plea before U.S. District Judge Lloyd George came with some difficulty. The company had agreed to enter an Alford plea, in which defendants don't admit guilt, only that the prosecution can prove its case.

Schiess said the plea does not preclude the government from investigating Payne's dismissal. He said authorities, if they chose to do so, would have to determine whether the dismissal came under federal jurisdiction.

Schiess said the defense represented Payne was fired for "just cause" and not for any...
MANAGING CHANGES TO YMP
SITE CHARACTERIZATION BASELINE

- Processing changes to YMP Baseline
  - Field change requests processed 205
  - Cost/schedule change requests 324
  Total Change Requests Processed 529

- Revisions to Project Documents
  - Administrative procedures 66
  - Branch technical procedures 8
  - Implementing line procedures 4
  - Quality Management procedures 10
  Total Approved YMP Procedures 88
POST-TOUR SURVEYS REVEALED 88% OF PUBLIC TOUR ATTENDEES FAVOR THE STUDY OF YUCCA MOUNTAIN

As of 6/19/93

Before

492

3198

64% Completely or somewhat in favor of the study

26% Undecided

10% Completely or somewhat opposed to the study

After

1421

4463

88% Completely or somewhat in favor of the study

8% Undecided

4% Completely or somewhat opposed to the study